

SECTION 117 – SUBMERSIBLE PUMPS

1. GENERAL

Pumps shall be Myers Model No. 4V Non-Clog, Submersible Pumps with 2 vane enclosed impeller. All openings in pump impeller and volute case to be large enough to pass a 3" diameter sphere. Discharge flange shall be 4 inch standard.

2. OPERATING CONDITIONS

Pumps shall have a capacity of 325 GPM (each) at a total head of 17 feet.

3. MOTORS

Pump motors shall be sealed submersible type rated 3 HP at 1750 RPM 60 Hertz. Motors shall be for single phase 230 volts. Single phase motor shall be of the capacitor run type. Stator winding to be of the open type with insulation good for 180 degree C. Ball bearings shall be designed for 30,000 hours B-10 life. Stator shall be heat shrunk into motor housing. A heat sensor thermostat shall be attached to and embedded in the winding and be connected in series with the motor starter contractor coil to stop motor if temperature of winding is more than 120 degree F. Thermostat to reset automatically when motor cools to a safe operating temperature. The common pump, motor shaft shall be 416 stainless steel.

4. SEALS

Motors shall be protected by two mechanical seals mounted in tandem with a seal chamber between the seals. Seal chamber shall be oil filled to lubricate seat face and to transmit heat from shaft to outer shell. Seal face shall be carbon and ceramic and lapped to a flatness of one light band. Double electrode shall be mounted in the seal chamber to detect any water entering the chamber through the lower seal. Water in chamber shall cause a red light to turn on at control box. The signal shall not stop the motor but act as a warning only, indicating that service is needed.

5. IMPELLER

Shall be cast iron and of the 2 vane non-clog enclosed type. Vane inlet tips shall be carefully rounded to prevent stringy material from catching in vanes. Pumpout vanes shall be used in front and back chamber and impeller shall be dynamically balanced by grinding on shroud faces. No holes are to be drilled for balancing. Impeller to be driven by stainless steel shaft key and impeller held in place with lock screw and washer. Impeller and motor shall lift off of case as a unit without disturbing discharge piping. Impeller neck shall run in bronze wear ring that is pressed into volute case.

6. PUMP CASE

The volute case shall be cast iron and have a flanged centerline discharge. Discharge flange shall be 4 inches standard with bolt holes straddling centerline. Bronze wear ring to be pressed into case for guiding impeller neck and to prevent corrosion freeze up. Wear ring to be held from rotating by locking with stainless steel set screw in end of ring.

7. PUMP AND MOTOR CASTING

All casting shall be high tensile cast iron and shall be treated with phosphate and chromate rinse. All fasteners shall be 302 stainless steel.

8. BEARING END CAP

Upper motor bearing cap shall be a separate casting for easy mounting and replacement.

9. POWER CABLES

Power cord and control cord shall be double sealed. The power and control conductor shall be single strand sealed with epoxy potting compound and then clamped in place with rubber seal bushing to seal outer jacket against leakage and to provide for strain pull. Cords shall withstand a pull of 300 pounds to meet U.L. requirements. Insulation of power and control cord shall be type SO or STOW. Both control and power cord shall have a green carrier ground conductor that attaches to motor frame.

10. LIFT-OUT RAIL SYSTEM

Shall consist of a combined check valve and seal fitting that mounts vertically into stationary discharge casting. Check valve and seal fitting shall seal with two "O" rings and tapered rubber seal ring into funnel of discharge case. Check valve flapper shall be spring loaded to prevent water hammer slam. Discharge casting shall be furnished with right and left hand discharge pipe connections for duplex system. Discharge pipe tapping shall be 4 inch standard pipe. Valve casting and discharge casting shall be painted inside and out before and after machining with baked-on epoxy paint. Upper guide plate shall be attached to the pump to support liftout fitting and guide pump on rails. A lifting eye shall be attached to plate and 5/16 galvanized chain and clevis shall be furnished for lifting pump. Two hold-down brackets shall be provided to prevent pump and seal fitting from rising on rails. Guide rails shall be 2 inch galvanized pipe. Rail support and mounting bushing shall be mounted to basin cover or cover frame. Guide rail supports shall be adjustable so that perfect vertical alignment of the rail can be obtained.

11. ELECTRICAL

A. Waterproof Junction Box. Junction box shall be for duplex made of aluminum with a cast-in sealing conduit. Cover shall be fitted with an "O" ring for water tight seal. Discharge connection from box shall be for 2" conduit. Proper sealing compounds shall be supplied to seal incoming power and control wiring from the electrical control box. Cord grip rubber grommet seal fitting shall be provided in box to seal pump power, control and level control cords. Conductor for these cords to connect to corresponding cords from motor control panel. Individual cords can be removed from junction box when required to remove pump without breaking cement seal or disturbing other connections. Box to be mounted near top of basin and in horizontal position for easy access to the internal wiring.

B. Level Controls. Water level shall be controlled with float control. These controls shall be the mercury tube type sealed in polyurethane float and weighted to hold position in sump. Three controls are needed as follows:

1. Pumps off
2. Lead Pump-on
3. Lag Pump-on

A mounting bracket that attaches to basin wall shall be provided to support controls. Control cords to connect to junction box with cord grip seal connectors.

C. Electrical Control Panel: All panels shall be in NEMA enclosure (Hoffman A-423610 LP with A-L1CR latch kit). Panels shall be for (230 Volts single phase). Control circuit and alarm circuit shall be for 115 Volts. In addition to items listed above, all panels shall include a main circuit breaker for each pump, a magnetic contractor with quick trip ambient compensated overload block, main circuit breaker for alarm and control circuits, separate auxiliary circuits for alarm and control circuits, yellow run light for each pump, H-O-A switch for each pump, red seal failure light for each pump. Alarm switch for on-off and test, outside flashing red alarm light, alternator relay to alternate pumps on each successive cycle and override circuit to start both pumps if level rises in sump, or to start second pump if one pump fails. Provide a separate alarm circuit that will turn on the alarm in case either or both pumps fail to start including a terminal strip for connecting pumps and controls. Panels shall also include start and run capacitors for each pump and a start relay for each pump. All panels shall have U.L. approval label.

D. Heater strip (25 watt) to prevent condensation in panel.

E. Duplex 115 volt utility outlet receptacle.

12. INSTRUCTIONS AND LABELS

All panel boxes shall include a schematic wiring diagram pasted in cover of box. All terminals to be clearly labeled with proper designation. Overload heater chart to be pasted in box cover.

13. OPTIONAL EQUIPMENT

The following optional equipment shall be provided:

A. Elapse time meter for each pump

B. Weatherproof alarm bell for mounting on outside of box and to operate in parallel with alarm light

C. Lighting Arrestor

14. ALTERNATE PUMPING SYSTEMS

The above specifications describe a Myers submersible pumping system. Other pumping systems may be used on this project if prior approval has been obtained from the Engineer. To receive consideration of any alternate system, full descriptive material must be submitted to the Engineer for evaluation purposes at least ten (10) days prior to the date of receiving proposals by the Owner. Notice of the approval of any alternate pumping system will be made only by Addendum, duly issued and mailed to each party having a set of contract documents.